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CRUISE RESULTS

North Pacific Cooperative Fisheries of Japan Vessel
Fukuyoshi Maru No. 26
Cruise No. 90-01

Japan-U.S. cooperative longline survey for sablefish and Pacific cod in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1990.

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INTRODUCTION

Since 1978, Japan and the United States have conducted an annual, cooperative longline survey in the northeastern Pacific Ocean along Alaska's continental slope. Formerly (1978-88), the Japanese government's Fishery Agency of Japan was the Japanese agency responsible for the survey. In 1989 and 1990, however, the survey was conducted by a private Japanese organization, the North Pacific Cooperative Fisheries of Japan, in cooperation with the Alaska Fisheries Science Center (AFSC) of the U.S. National Marine Fisheries Service. The 1990 survey was conducted between April and September using the Fukuyoshi Maru No. 26, a commercial Japanese longline vessel provided by the North Pacific Cooperative Fisheries of Japan. As in previous years, the survey was directed primarily at sablefish (Anoplopoma fimbria) and Pacific cod (Gadus macrocephalus) between depths of 100 m and 1,000 m. Areas surveyed included the western Aleutians, eastern Aleutians, Regions I, II, III, IV, and V of the eastern Bering Sea, and the following International North Pacific Fisheries Commission (INPFC) statistical areas in the Gulf of Alaska: Shumagin, Chirikof, Kodiak, Yakutat and Southeastern (Fig. 1). These surveys now provide 12 consecutive years (1979-90) of standardized data for the Gulf of Alaska and Aleutian region, and 9 years (1982-90) of standardized data for the eastern Bering Sea. (The first year of the survey, 1978, was experimental and could not be used for population assessment purposes.)

METHODS

The methods used in 1990 were similar to those used in previous years. The Fukuyoshi Maru No. 26, a 60.0 m (197 ft) longline vessel, carried a crew of 23 Japanese nationals. One station was occupied each day. At each station, one longline 16 km (8.6 nmi) long was set and retrieved. The longline consisted of 160 hachis (Japanese term for "skates" or lengths of longline), each 100 m (328 ft) long, tied together. Halibut anchors and surface buoys were attached at the beginning and end of the longline and one-third and two-thirds of the way along the line. A 3-kg (7 lb) rock anchored each hachi. Each hachi had 45 "J" style hooks spaced at 2 m intervals along the line. Thus, 7,200 hooks were fished each day at a station. The hooks were baited with squid and were attached to the line by 1.2 m (47 in) gangions.

Previously (1982-89), 108 stations were usually fished in the survey. Positions of each station were replicated as much as possible from year to year. This procedure was followed in 1990, with one modification: 9 additional stations were added in the northern part of the eastern Bering Sea (area Bering V in Fig. 1), resulting in a planned total of 117 stations. These 9 new stations were added to extend the coverage of the survey along the continental slope of the eastern Bering Sea to the U.S.-U.S.S.R boundary.

The vessel generally attempted to fish depths between 100 m and 1,000 m (55-548 fm) at each station. These depths correspond to the bathymetric distribution of most commercial-sized sablefish in Alaskan waters. However, because of bottom irregularities and the varied angle of the continental slope, it was often impossible to fish the complete depth range at all stations. The longline was usually set starting in shallow water, and then laid seaward across the isobaths of the continental slope into deeper water. At some stations, where Pacific cod was the primary species of interest and the angle of the continental slope was gradual, the entire longline was set at depths less than 400 m. Most of these shallow stations were in the eastern Bering Sea.

At each station, the soak time (time between set and retrieval) of an individual hachi depended upon the hachi's location in the longline. Setting the gear usually began in the morning (0800-0900 hours) and finished within 1 h. The vessel then returned to the starting position, waited until the first hachi had been in the water for 3 h, and began hauling the gear. Retrieval of the entire longline usually lasted 5-6 h. Thus, soak time varied from 3 h at the beginning of the longline to 7 or 8 h at the end.

The catch was tallied by species and hachi number as the longline was brought aboard. Also, the depth at which the fish were caught was estimated by measuring the depth of water under the vessel every fifth hachi.

The catch was then separated into individual species for further sampling. Pacific halibut were landed without a gaff, measured for length, and immediately released. Other species were retained and weighed. Commonly caught fish were individually measured to determine length frequencies. These included sablefish, Pacific cod, arrowtooth flounder, Greenland turbot, rougheye rockfish (Sebastes aleutianus), shortraker rockfish (S. borealis), shortspine thornyhead (Sebastolobus alascanus), giant grenadier (Albatrossia pectoralis), and Pacific grenadier (Coryphaenoides acrolepis). Sablefish and Pacific cod were separated by sex and depth stratum before they were measured.

At most stations, a subsample of sablefish was held in live tanks, and then tagged and released. Only robust, uninjured fish were selected for tagging. In the past several years of this survey, most of the fish tagged and released were relatively small (<65 cm in fork length), but in 1990 a more random subsample of all sizes was selected for tagging. The tags used were plastic Floy[1] anchor tags, as in previous years. The AFSC Resource Assessment and Conservation Engineering Division (RACE) supplied the tags in the Aleutian region, eastern Bering Sea, and western half of the Gulf of Alaska (labeled "U.S. National Marine Fisheries Reward, Seattle, Washington U.S.A."). The AFSC Auke Bay Laboratory (ABL) supplied the tags in the eastern half of the Gulf of Alaska (labeled "U.S. National Marine Fisheries Reward, Auke Bay, Alaska USA").

Sablefish otoliths were collected throughout the cruise for the AFSC. Generally, two otoliths were collected per fish. In the Aleutian Islands and eastern Bering Sea, otoliths were taken from five fish per centimeter length per sex in each of the following areas: Aleutian Islands (combining Western and Eastern Aleutians), Bering I, Bering II, Bering III, and Bering IV , resulting in a total of 5 separate otolith collections. In the Gulf of Alaska, the otolith collection scheme was somewhat different: otoliths were taken from three fish per centimeter length per sex in each of 3 depth strata (101-200 m, 201-400 m, and 401-1,000 m) in 3 areas (Shumagin, Kodiak, and Southeastern), resulting in a total of nine separate otolith collections for this region.

After completion of sampling, grenadiers were discarded because they were not marketable, and the rest of the catch was processed and frozen for later sale in Japan as food. Sale of the fish helped to defray the Japanese fishing cooperative's cost of conducting the survey.

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[1]Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Scientists from the AFSC will analyze the sablefish data collected on the survey by calculating the sablefish catch per hachi. Catch per hachi, a measure of relative abundance, is calculated by dividing the number of fish caught by the number of hachis fished. This calculation is done for each area and by 100 m increments from 100 m to 1,000 m.

RESULTS

A total of 116 stations was sampled by the Fukuyoshi Maru No. 26 during the 1990 cruise (Fig. 1). Of these, 107 were replicate stations that had been fished in previous years of the survey (stations 1-108), and 9 were the new stations added in the eastern Bering Sea (stations 109-117). One planned station (station 36) was not sampled in 1990. The exact positions and depth ranges fished are listed in Table 1.

In the 1989 cooperative survey, many stations in the Aleutian region and eastern Bering Sea had to be moved from their standard positions because of gear conflicts with U.S. fishing vessels operating in the vicinity. In 1990, these gear conflicts were minimal, and all the replicate stations were generally located within 1 nmi of their standard, pre-1989 positions.

During the entire cruise, 18,348 hachis or 1,835 km (991 nmi) of longline gear were set. A total of 246,979 fish was caught on the 825,660 hooks set; thus, 29.9% of the hooks caught and retained fish.

Sablefish and Pacific cod made up most of the catch (Table 2). Sablefish comprised 32.7% (80,678 fish) of the catch in numbers, and Pacific cod, 31.3% (77,245 fish). Sablefish were most abundant in the Gulf of Alaska, and Pacific cod were most abundant in the eastern Bering Sea. Catch rates and average weights of sablefish and Pacific cod for each station are listed in Table 3. As many as 3,101 sablefish (station 101) and 3,625 Pacific cod (station 116) were caught at a single station. Compared to recent past years of the cooperative survey, catches of sablefish declined substantially in all areas except Bering IV; catches of Pacific cod also declined sharply in the eastern Bering Sea. Rockfish were most abundant in the Aleutians and the eastern Gulf of Alaska; in all areas, most of the rockfish catch was either shortraker or rougheye rockfish. Nearly all the Greenland turbot catch was in the Aleutians or eastern Bering Sea. Giant grenadiers were most abundant in the Aleutians and western Gulf of Alaska.

In past years of the survey, killer whales often interfered with the longline operations at stations in the eastern Bering Sea by stripping hooked fish off the line. In the 1990 survey, killer whales were observed in the vicinity at several stations in the

eastern Bering Sea, but they appeared to have little or no effect on fishing operations.

A total of 4,306 sablefish was tagged and released in the 1990 survey, 5.3% of all sablefish caught (Table 2). Most of the fish were tagged in the Gulf of Alaska. Since 1978, the cooperative longline survey has tagged and released a cumulative total of 152,852 sablefish in the survey area.

Otoliths were collected for the United States from 3,105 sablefish: 1,431 in the Aleutian region and eastern Bering Sea, and 1,674 in the Gulf of Alaska.

Detailed analyses of the survey results for sablefish, including length compositions and estimates of relative population numbers and weights, will be completed for the Gulf of Alaska by the AFSC Auke Bay Laboratory, and for the Aleutian region and eastern Bering Sea by the AFSC Resource Ecology and Fisheries Management Division (REFM). The 1990 results for the Gulf of Alaska will also be compared with results from another, concurrent longline survey in the Gulf (the 1990 domestic longline survey) by the AFSC RACE Division. Preliminary results from all these analyses should be available from the AFSC in mid-1991.

SCIENTIFIC PERSONNEL

29 April-9 September
Kiyoshi Fujii, North Pacific Cooperative Fisheries of Japan, Tokyo, Japan.

29 April-5 June
Frank Shaw, AFSC/RACE Division, Seattle.

5 June-9 July
Darlene Everhart, AFSC/REFM Division, Seattle.

10 July-13 August
Jeffrey Horton, AFSC/ABL, Auke Bay, Alaska.

14 August- 9 September
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Table 1. Position and depth of each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1990.

Station number	Position at start of longline	Position at end of longline	Depth range shallow (m)	Depth range deep (m)
	Eastern Bering Sea			
1	58°47.0'N 177°33.1'W	58°48.9'N 177°47.2'W	153	760
2	58°36.8'N 176°39.1'W	58°34.3'N 176°54.0'W	154	620
3	58°40.5'N 176°00.9'W	58°35.4'N 176°13.2'W	139	201
4	58°30.5'N 175°40.0'W	58°29.7'N 175°54.7'W	185	850
5	58°39.0'N 174°21.0'W	58°32.6'N 174°29.3'W	150	182
6	58°20.8'N 174°20.1'W	58°22.1'N 174°27.1'W	183	800
7	58°00.9'N 173°51.0'W	57°53.3'N 173°51.0'W	126	140
8	57°38.3'N 174°10.5'W	57°45.4'N 174°17.6'W	150	800
9	57°05.3'N 173°27.1'W	57°08.0'N 173°13.5'W	125	230
10	56°49.0'N 173°20.6'W	56°56.2'N 173°25.8'W	165	600
11	56°37.9'N 172°24.3'W	56°40.9'N 172°12.3'W	128	180
12	56°37.9'N 172°21.0'W	56°31.4'N 172°28.2'W	177	700
13	56°29.0'N 171°26.1'W	56°26.0'N 171°38.0'W	165	610
14	56°15.9'N 171°10.5'W	56°23.5'N 171°16.4'W	140	215
15	56°10.0'N 170°39.4'W	56°07.2'N 170°48.3'W	140	820
16	56°00.3'N 169°52.0'W	56°07.7'N 169°57.6'W	120	190
17	56°03.0'N 169°37.8'W	55°58.9'N 169°49.7'W	180	920
18	56°21.0'N 169°08.0'W	56°16.5'N 169°20.9'W	127	240
19	56°01.5'N 168°08.3'W	56°04.0'N 168°22.0'W	144	213
20	55°50.0'N 168°50.0'W	55°54.3'N 169°01.3'W	157	783
21	55°38.0'N 168°14.0'W	55°33.9'N 168°26.1'W	135	190
22	55°26.1'N 168°02.4'W	55°22.6'N 168°14.0'W	185	900
23	55°04.0'N 167°00.0'W	54°58.9'N 167°11.0'W	148	195
24	54°55.6'N 167°10.0'W	54°48.5'N 167°15.6'W	245	420
25	54°50.4'N 167°19.3'W	54°46.3'N 167°31.7'W	430	700
26	54°29.9'N 167°05.5'W	54°22.0'N 167°11.2'W	485	740
27	54°40.1'N 166°25.0'W	54°32.6'N 166°30.7'W	323	450
28	54°47.7'N 166°14.1'W	54°41.4'N 166°22.4'W	187	300
29	54°55.3'N 166°02.3'W	54°49.3'N 166°11.1'W	140	167
30	54°28.0'N 165°51.5'W	54°25.5'N 165°39.1'W	300	460
31	54°06.5'N 166°22.0'W	54°14.2'N 166°23.8'W	93	900
32	53°47.0'N 167°20.4'W	53°41.4'N 167°27.6'W	106	600
33	53°36.3'N 168°17.8'W	53°38.5'N 168°04.8'W	130	880
34	53°17.4'N 168°48.2'W	53°22.0'N 168°57.0'W	520	850
109	60°48.0'N 178°38.2'W	60°48.0'N 178°55.0'W	187	230
110	60°35.2'N 178°56.2'W	60°35.0'N 179°12.8'W	280	470
111	60°29.4'N 179°07.3'W	60°23.3'N 179°18.2'W	460	703
112	60°27'0 N 178°49.8'W	60°29.4'N 178°33.8'W	200	325
113	60°07'3 N 178°38.8'W	60°15.5'N 178°38.8'W	173	353
114	59°39'0 N 177°10.0'W	59°35.5'N 177°24.1'W	154	200
115	59°37'7 N 178°10.7'W	59°34.7'N 178°25.6'W	164	490
116	59°20'0 N 177°21.5'W	59°14.7'N 177°33.1'W	165	196
117	59°13'4 N 178°05.8'W	59°19.3'N 178°15.8'W	171	660

Table 1.--(continued).

Station number	Position at start of longline	Position at end of longline	Depth range shallow (m)	Depth range deep (m)
		Aleutian Region		
35	53°01.4'N 170°09.6'W	53°06.6'N 170°17.8'W	181	720
36		not fished		
37	52°25.2'N 173°30.4'W	52°17.6'N 173°30.0'W	270	780
38	52°14.4'N 174°50.4'W	52°20.7'N 174°45.8'W	129	700
39	52°08.5'N 175°38.0'W	52°11.3'N 175°48.8'W	125	900
40	51°58.3'N 176°26.4'W	52°03.7'N 176°19.6'W	109	800
41	51°54.3'N 177°34.0'W	51°55.5'N 177°35.1'W	215	1260
42	51°45.4'N 178°57.8'W	51°39.3'N 178°48.7'W	238	740
43	52°02.8'N 178°17.3'E	52°07.3'N 178°28.4'E	137	720
44	52°15.9'N 176°00.6'E	52°19.0'N 176°10.8'E	110	600
45	52°40.5'N 174°25.5'E	52°46.0'N 174°16.0'E	90	1000
46	53°04.0'N 172°52.0'E	53°03.8'N 172°40.7'E	97	600
47	52°32.0'N 173°00.5'E	52°33.2'N 172°48.0'E	125	1000
48	52°20.0'N 174°14.0'E	52°15.0'N 174°04.0'E	115	800
49	51°41.7'N 175°50.0'E	51°35.5'N 175°41.5'E	128	650
50	51°46.3'N 177°00.0'E	51°41.7'N 177°09.2'E	130	900
51	51°43.2'N 178°09.7'E	51°35.5'N 178°06.8'E	110	600
52	51°19.7'N 179°03.9'E	51°11.5'N 179°02.4'E	96	920
53	51°24.3'N 178°36.5'W	51°20.9'N 178°26.5'W	102	930
54	51°45.1'N 178°11.3'W	51°44.9'N 178°21.8'W	98	850
55	51°35.0'N 177°39.4'W	51°31.5'N 177°48.3'W	150	800
56	51°34.5'N 176°44.3'W	51°27.4'N 176°50.2'W	187	800
57	51°44.0'N 175°59.0'W	51°35.9'N 176°02.0'W	176	730
58	51°52.9'N 175°08.5'W	51°45.0'N 175°08.3'W	161	520
59	51°53.7'N 174°19.5'W	51°48.0'N 174°28.0'W	123	800
60	51°55.3'N 173°30.2'W	51°52.3'N 173°42.3'W	135	800
61	52°27.3'N 170°16.0'W	52°20.3'N 170°23.5'W	204	700
		Gulf of Alaska		
62	52°33.3'N 169°30.6'W	52°28.2'N 169°31.4'W	360	750
63	52°58.0'N 168°09.5'W	52°50.7'N 168°14.0'W	125	850
64	53°11.5'N 166°51.2'W	53°04.1'N 166°54.7'W	220	850
65	53°34.1'N 165°42.1'W	53°26.0'N 165°46.0'W	130	780
66	53°44.2'N 164°25.0'W	53°38.5'N 164°35.3'W	147	780
67	53°58.5'N 163°14.4'W	53°52.3'N 163°22.3'W	115	800
68	54°05.0'N 162°03.2'W	54°02.4'N 162°14.7'W	118	700
69	54°12.1'N 161°08.0'W	54°19.5'N 161°03.1'W	130	810
70	54°22.0'N 160°13.0'W	54°14.0'N 160°13.8'W	144	710
71	54°29.7'N 159°15.0'W	54°22.5'N 159°20.0'W	149	850
72	54°38.2'N 158°32.1'W	54°31.7'N 158°38.4'W	140	730
73	54°51.0'N 157°45.3'W	54°42.9'N 157°49.6'W	152	750
74	55°04.8'N 156°41.7'W	55°12.5'N 156°39.3'W	305	970
75	55°30.0'N 155°49.8'W	55°38.4'N 155°51.6'W	215	226
76	55°45.1'N 155°07.6'W	55°37.3'N 155°11.1'W	153	640

Table 1.--(continued).

Station number	Position at start of longline	Position at end of longline	Depth range shallow (m)	Depth range deep (m)
77	56°00.0'N 154°37.9'W	55°53.5'N 154°45.5'W	380	900
78	55°59.0'N 154°00.7'W	55°52.2'N 154°02.0'W	203	700
79	56°17.0'N 153°00.0'W	56°14.0'N 153°10.6'W	135	750
80	56°33.0'N 152°03.1'W	56°26.1'N 152°09.4'W	146	880
81	57°07.1'N 151°15.5'W	56°58.6'N 151°17.2'W	190	820
82	57°24.8'N 150°34.0'W	57°16.7'N 150°32.0'W	180	750
83	57°30.2'N 149°54.8'W	57°37.8'N 149°52.8'W	390	780
84	57°58.4'N 149°09.2'W	57°50.5'N 149°13.9'W	160	880
85	58°17.5'N 148°38.0'W	58°09.8'N 148°39.6'W	182	880
86	58°40.7'N 148°17.2'W	58°33.0'N 148°19.2'W	285	850
87	59°08.0'N 148°38.3'W	59°00.0'N 148°40.0'W	150	240
88	59°02.1'N 147°53.7'W	58°54.2'N 147°57.1'W	150	950
89	59°16.6'N 146°50.0'W	59°10.6'N 146°57.3'W	187	880
90	59°28.0'N 145°26.6'W	59°27.9'N 145°37.2'W	170	800
91	59°31.2'N 144°41.9'W	59°26.2'N 144°53.9'W	176	900
92	59°34.3'N 143°37.7'W	59°27.0'N 143°40.0'W	139	1000
93	59°35.5'N 142°31.9'W	59°29.4'N 142°39.3'W	170	850
94	59°23.6'N 142°10.0'W	59°27.1'N 142°22.0'W	225	800
95	59°02.7'N 141°20.1'W	59°01.6'N 141°35.5'W	290	850
96	58°41.0'N 140°38.7'W	58°42.4'N 140°52.3'W	235	960
97	58°28.7'N 139°28.6'W	58°26.5'N 139°39.5'W	200	820
98	58°08.3'N 138°43.2'W	58°09.0'N 138°53.0'W	190	920
99	57°52.4'N 137°23.8'W	57°52.7'N 137°35.9'W	209	850
100	57°31.0'N 136°31.0'W	57°36.6'N 136°38.9'W	190	870
101	57°11.0'N 136°15.1'W	57°14.8'N 136°24.9'W	260	920
102	56°50.2'N 136°00.2'W	56°57.2'N 136°07.1'W	230	880
103	56°24.0'N 135°23.9'W	56°21.0'N 135°36.4'W	156	240
104	55°58.0'N 135°24.7'W	56°02.6'N 135°35.3'W	240	850
105	55°32.2'N 134°58.0'W	55°36.1'N 135°07.6'W	210	880
106	55°20.5'N 134°43.6'W	55°22.6'N 134°57.3'W	260	860
107	54°52.8'N 134°17.3'W	54°58.8'N 134°25.6'W	228	900
108	54°27.5'N 133°55.7'W	54°32.3'N 134°04.0'W	250	820

Table 2.--Numbers of fish caught and sablefish tagged, by area[1], Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1990.

Species	Western Aleutians	Eastern Aleutians	Bering I	Bering II	Bering III	Bering IV	Bering V	Shumagin	Chirikof	Kodiak	Yakutat	South-eastern	Total
Sablefish	1,481	4,182	2,217	1,755	1,813	1,228	344	8,891	9,516	17,874	16,354	15,023	80,678
Pacific cod	9,625	13,468	2,738	11,134	9,663	6,683	16,719	3,183	2,573	662	425	372	77,245
Pacific halibut	276	654	279	169	470	197	540	149	105	76	69	79	3,063
Arrowtooth flounder	334	490	868	2,655	1,530	1,798	1,678	1,151	1,183	830	199	138	12,854
Greenland turbot	288	907	1,573	734	673	494	908	4	0	0	0	0	5,581
Rockfish[2]	1,479	2,222	172	27	148	48	30	640	289	473	940	1,148	7,616
Thornyheads	901	482	283	35	66	6	7	1,590	750	1,109	661	643	6,533
Giant grenadier	5,039	5,593	73	836	808	858	1,635	6,688	5,962	4,155	2,016	431	34,094
Other	2,424	2,286	1,117	3,966	1,202	524	5,525	253	281	859	612	266	19,315
All species combined	21,847	30,284	9,320	21,311	16,373	11,836	27,386	22,549	20,659	26,038	21,276	18,100	246,979
No. of sablefish tagged	42	228	150	110	84	91	16	526	458	907	870	824	4,306
No. of stations	10	16	5	14	9	6	9	10	7	10	11	9	116

[1]For location of areas, see Figure 1.
[2]Includes all species of Sebastes rockfish; does not include thornyheads (Sebastolobus spp.).

Table 3. Catch rates and average weights of sablefish and Pacific cod at each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1990.

Station no.	Sablefish		Pacific cod	
	No. caught/ 100 hooks	average round weight (lb)	No. caught/ 100 hooks	average round weight (lb)
		Bering IV		
1	3.14	8.4	15.79	11.5
2	3.21	7.2	12.28	8.5
3	0.00	-	31.31	10.5
4	5.53	6.7	9.50	8.5
5	0.00	-	20.56	8.3
6	5.18	8.0	3.39	9.3
		Bering III		
7	0.00	-	17.58	14.8
8	3.00	8.8	7.15	11.1
9	0.03	7.7	33.64	10.6
10	3.64	7.9	12.00	9.2
11	0.03	2.4	18.96	10.3
12	4.47	7.1	3.71	8.1
13	5.32	7.8	9.86	8.4
14	0.01	10.4	18.35	8.4
15	8.68	9.2	12.96	9.0
		Bering II		
16	0.00	-	26.26	8.6
17	6.33	7.7	7.85	10.6
18	1.42	2.1	20.54	9.0
19	0.00	-	19.78	10.2
20	3.21	6.3	11.04	11.4
21	0.00	-	30.44	12.1
22	2.15	7.7	10.76	9.3
23	0.00	-	7.97	10.8
24	1.17	5.5	4.53	7.4
25	7.88	5.8	0.00	-
26	0.78	5.0	0.00	-
27	1.44	5.2	0.43	7.6
28	0.00	-	2.40	7.3
29	0.00	-	12.63	7.8
		Bering I		
30	1.75	5.3	0.03	5.8
31	4.32	6.7	15.85	9.5
32	1.64	8.4	14.81	8.7
33	9.15	7.3	7.35	8.8
34	13.94	7.4	0.00	-

Table 3.--(continued).

Station no.	Sablefish No. caught/ 100 hooks	Sablefish average round weight (lb)	Pacific cod No. caught/ 100 hooks	Pacific cod average round weight (lb)
		Bering V		
109	0.00	-	40.06	8.3
110	0.08	7.0	8.36	7.6
111	0.38	6.6	0.00	-
112	0.00	-	44.74	9.3
113	2.31	6.9	18.06	8.9
114	0.00	-	27.74	10.3
115	0.15	7.4	28.46	9.6
116	0.00	-	50.35	12.2
117	1.86	7.8	14.46	11.2
		Eastern Aleutians		
35	2.08	8.4	10.49	8.4
36		not fished		
37	15.14	6.0	0.63	7.5
38	1.44	8.3	27.72	8.1
39	8.28	7.3	12.04	7.1
40	11.01	7.9	15.33	6.4
41	1.15	8.3	2.36	8.4
42	1.04	7.8	8.21	6.2
		Western Aleutians		
43	2.79	6.3	1.58	8.6
44	2.08	8.0	19.65	10.6
45	1.60	9.8	14.21	14.9
46	1.22	10.8	26.11	11.6
47	1.53	10.1	12.86	7.2
48	2.11	10.1	13.45	7.5
49	2.13	8.9	2.18	14.3
50	3.67	10.4	13.64	9.2
51	0.38	7.7	11.81	9.6
52	3.11	8.8	18.44	9.2
		Eastern Aleutians		
53	5.26	7.1	15.82	6.7
54	1.43	8.1	10.35	7.5
55	0.94	8.3	10.57	5.0
56	0.30	6.3	18.88	6.7
57	3.22	5.8	8.10	7.3
58	1.97	6.9	10.38	9.2
59	3.44	7.9	17.00	10.8
60	1.50	7.6	12.56	9.4
61	0.47	7.0	18.28	6.1

Table 3.--(continued).

Station no.	Sablefish No. caught/ 100 hooks	Sablefish average round weight (lb)	Pacific cod No. caught/ 100 hooks	Pacific cod average round weight (lb)
		Shumagin		
62	6.07	7.8	0.00	-
63	7.22	8.7	3.29	7.2
64	10.82	6.8	1.32	4.8
65	12.74	7.3	6.18	8.5
66	14.10	7.1	1.61	6.7
67	13.11	9.3	2.79	6.8
68	13.63	8.1	1.35	5.6
69	17.69	6.9	4.93	4.8
70	12.65	7.3	12.03	5.6
71	17.74	7.4	10.71	5.5
		Chirikof		
72	14.29	7.9	4.82	5.2
73	19.54	6.9	8.01	5.7
74	12.88	7.5	0.00	-
75	15.04	6.4	15.40	6.4
76	19.60	6.8	5.22	5.5
77	27.83	7.6	0.00	-
78	22.99	7.3	2.28	5.5
		Kodiak		
79	40.47	7.8	0.36	7.8
80	11.69	6.8	0.88	6.2
81	21.58	7.2	0.50	7.0
82	25.42	6.7	1.25	6.2
83	20.03	7.0	0.00	-
84	23.01	6.7	1.81	6.2
85	26.29	7.4	1.68	6.3
86	26.54	7.7	0.00	-
87	33.06	7.7	1.14	6.4
88	20.15	7.4	1.58	7.7

Table 3.--(continued).

Station no.	Sablefish: No. caught/ 100 hooks	Sablefish: average round weight (lb)	Pacific cod: No. caught/ 100 hooks	Pacific cod: average round weight (lb)
		Yakutat		
89	29.10	7.5	0.54	7.0
90	16.83	7.1	0.14	9.1
91	28.10	7.6	0.96	7.2
92	22.36	7.4	3.36	6.0
93	19.64	7.7	0.65	8.7
94	17.10	6.7	0.07	9.5
95	21.21	7.2	0.00	-
96	14.90	8.4	0.00	-
97	22.14	7.7	0.15	10.2
98	13.93	7.9	0.03	13.9
99	21.92	8.6	0.00	-
		Southeastern		
100	37.00	8.1	0.01	15.0
101	43.07	8.2	0.01	3.3
102	33.90	8.5	0.04	6.7
103	7.82	6.2	3.79	6.5
104	18.92	7.5	0.18	6.5
105	23.60	7.1	0.88	6.3
106	22.33	6.9	0.10	6.8
107	13.88	7.1	0.15	6.1
108	8.14	7.3	0.00	-

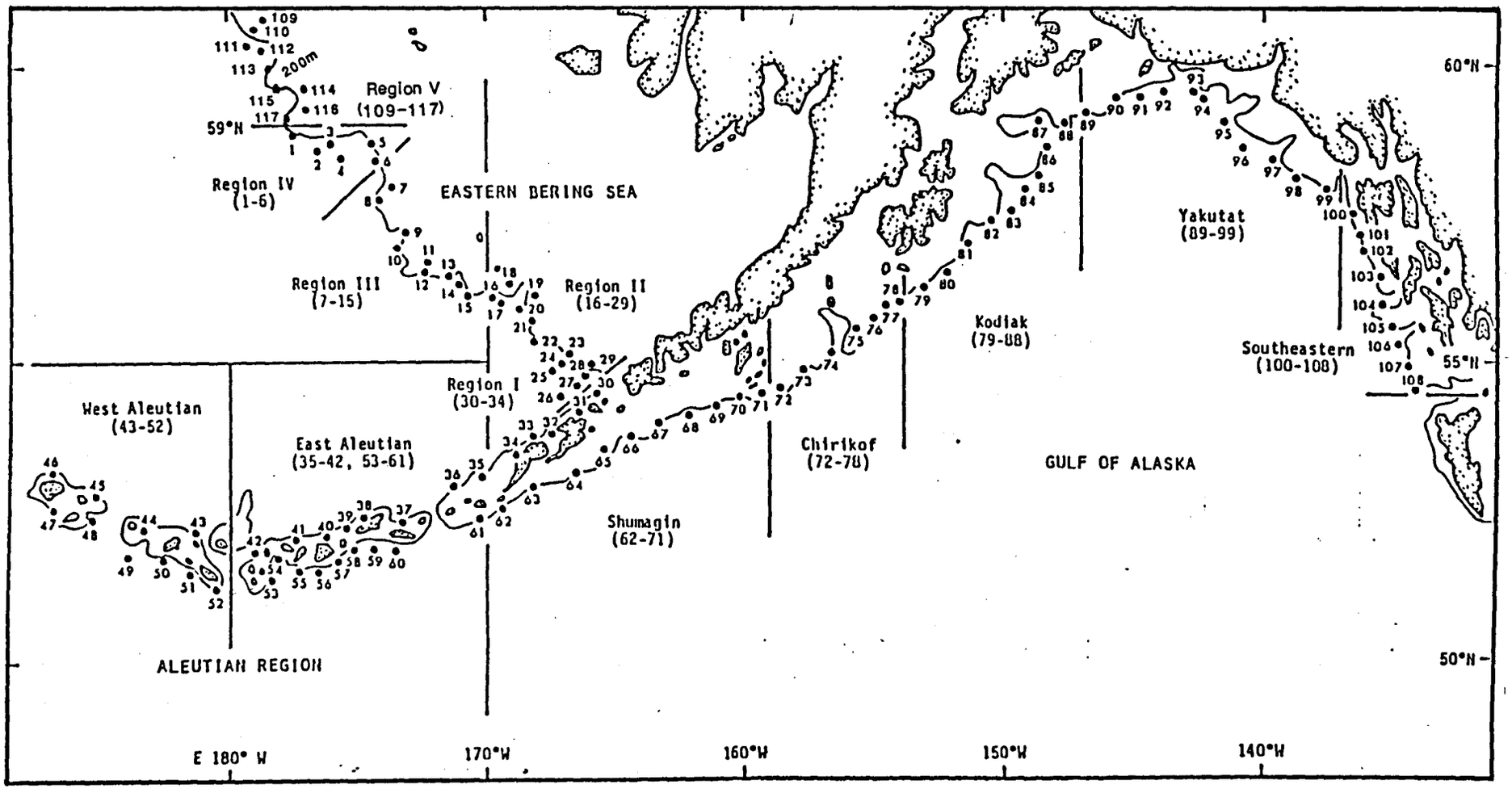

Figure 1. Location of stations, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1990. Station 36 was not fished.